

Test Facilities for Rocket Engines
Fluidic Ground Means for Launchers
Flight Components for Spacecrafts
Mathematical Modeling and Software

Introducing Novaeka

We are an Italian company founded in 2018, providing **high quality fluidic** and **mechanical solutions for the aerospace industry**, primarily for the ground segment.

The team is composed of **highly qualified experts** with different backgrounds ranging from aerospace engineering to mathematics, physics and computer science.

Our core skills are **Fluid dynamics, Cryogenics, Mechanical Engineering, Physical Modeling** and **Software development**.

Around our core team we have built in the years a constellation of trusted suppliers and subcontractors that allow us to deliver **turnkey solutions** to our clients, maintaining the **flexibility** and **adaptability** that only a small team can guarantee.

To ensure **extremely quick response times** to changes in requirements we have developed **software tools** that automate and streamline many time-consuming and error-prone tasks in the design process.

Test Facilities for Liquid Rocket Engines

In 2019 we designed the fluidic subsystem of the Space Propulsion Test Facility for AVIO, one of Europe largest test facilities for cryogenic liquid rocket engines.

The facility was built in 2021 in Sardinia, and a 100 kN (22,000 lbf) LOX/LCH4 engine was successfully tested there several times. The facility will soon be expanded to allow testing engines up to 1,000 kN (220,000 lbf).

We have then designed two facilities for 40 and 500 kN (8,800 - 110,000 lbf) LOX/LCH4 engines to be built in the near future. We also designed the Orbital Propulsion Test Facility for AVIO, testing a 4 kN (880 lbf) HTP/RP1 engine and achieving the successful ignition of the engine.

We have become Prime Contractors for the whole design phase, thus including civil works, electric engineering, safety and regulations, authorization and permitting, data acquisition and control: all these activities are managed by Novaeka and sub-contracted to trusted partners that are expert in each field.

In 2024 we also became manufacturers of test facilities, delivering turnkey systems ready for use, such as testing facilities for cryogenic flight tanks and turbopumps with LN2.



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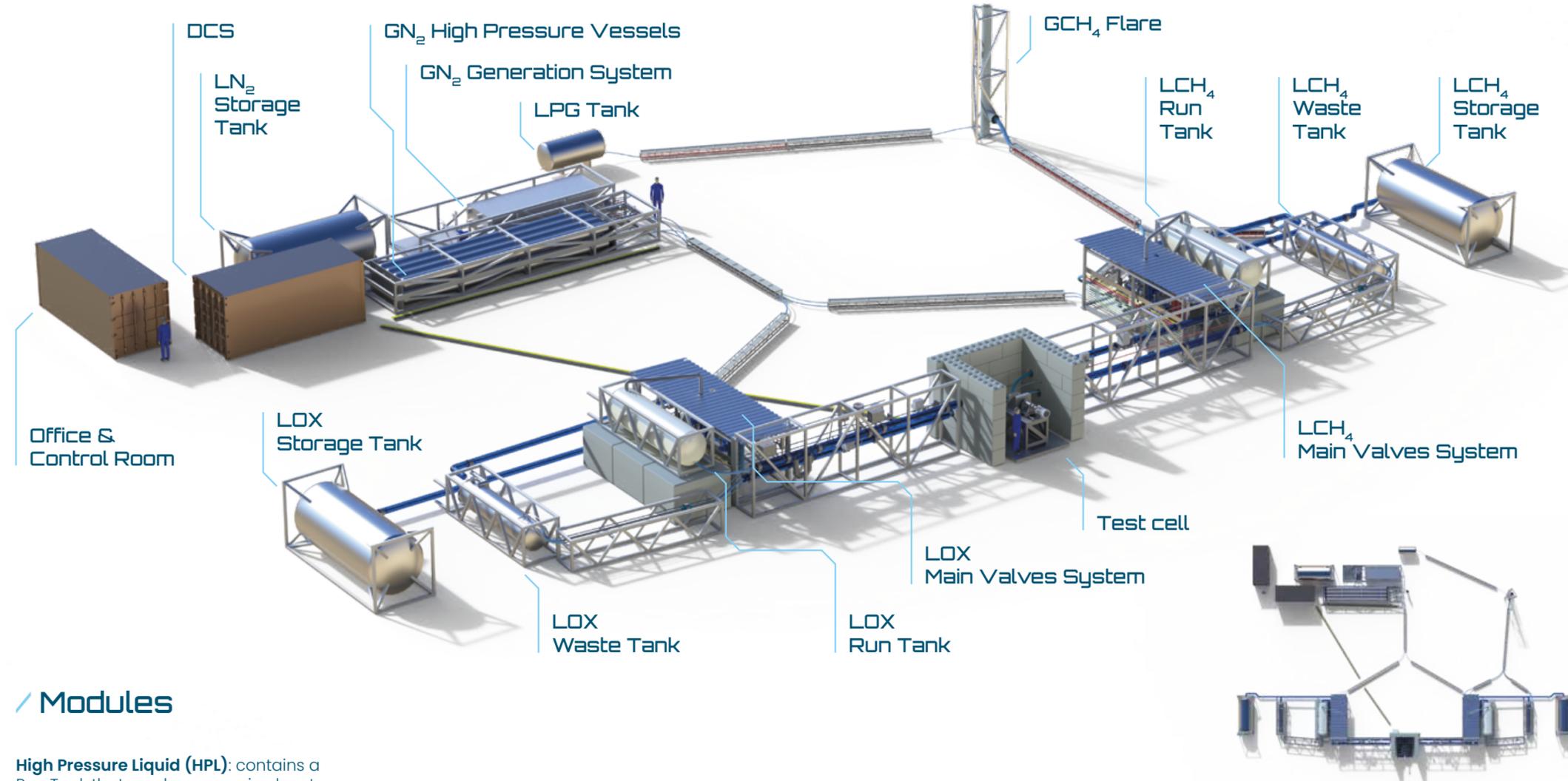
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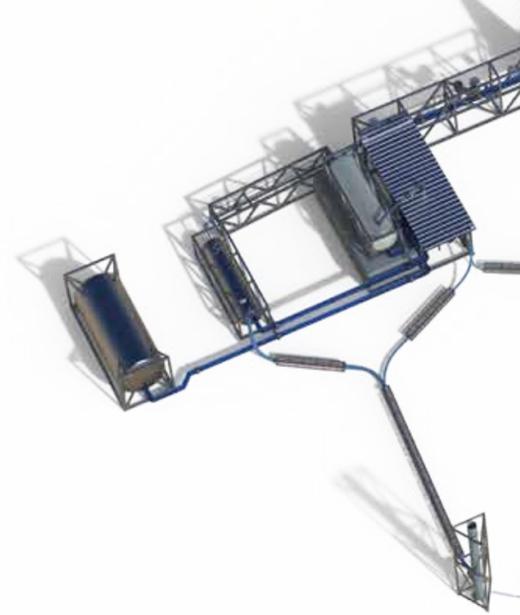
*Your partner
for test facilities*

The first Portable Modular Test Facility for Rocket Engines



Possible Test Articles

1. **Thrust Chamber** (Liquid/Liquid or Liquid/Gas)
2. **Thrust Chamber + Regenerative-Cooled Nozzle**, for Expander engines
3. **Preburners** for Gas Generator and Staged Combustion engines
4. **Turbopump**
5. **Injectors** (Cold Flow)
6. **Valves** and other flight components
7. **Fully integrated engines**



Tech Spec

Interface	max flow rate kg/s (lb/s)	max pressure bar (psi)
LOX Main Supply	22.0 (48.5)	180 (2610)
LCH₄ Main Supply	8.0 (17.6)	180 (2610)
GCH₄ Main Supply	8.0 (17.6)	180 (2610)
GOX for igniters	0.05 (0.11)	180 (2610)
GH₂/GCH₄ for igniters	0.05 (0.11)	180 (2610)
GN₂/GHe for purging	0.05 (0.11)	10 (145)
H₂O for TCA cooling	30.0 (66.1)	180 (2610)

Max test duration at max flow rate: 60 seconds.
Max thrust: 100 kN (22,000 lbf).

Modules

High Pressure Liquid (HPL): contains a Run Tank that can be pressurized up to 200 bar (2900 psi) and the lines that connect to the Test Cell. It can provide up to 22 kg/s (48.5 lb/s) of LOX or 8 kg/s (17.6 lb/s) of LCH₄.

Gaseous Nitrogen Pressurization (GNP): contains high pressure vessels up to 500 bar (7250 psi) that are filled pumping LN₂ through a high-pressure vaporizer. The module provides the gas for pressurizing the HPL module, for pneumatic valves actuation and flushing.

High Pressure Gas (HPG): contains a Run Tank that can be loaded with high-pressure gaseous propellant up to 500 bar (7250 psi) and used in blow-down to provide up to 22 kg/s (48.5 lb/s) of GOX or 8 kg/s (17.6 lb/s) of GCH₄.

Waste Collection and Disposing (WCD): includes a waste tank to collect propellants depleted by the facility and the Test Article, and a disposal system (vent into atmosphere for gasified LOX, burn through a flare for gasified LCH₄).

Test Cell (TC): the protected and shielded area where the Test Article is mounted. It offers multiple connections for the same functional purpose, thus simplifying the design of the Test Equipment (the lines that connect the facility interfaces to the Test Article proper) and provides mechanical interfaces for easy installation.

Key Features

Portable

Can be shipped all around the world, deployed in just a few days exactly where needed, close to the client facilities.

Modular

Different independent interchangeable modules optimized for specific tasks.

Configurable

Based on the tests required by the client only the necessary modules are shipped.

Digital

A full Digital Twin of the facility can be used to train the personnel in advance, optimize testing sequences and perform virtual testing.

Multi-propellant

Compatible with Cryogenic (LOX, LCH₄) and Storable (HTP, RPI) propellants.

Multipurpose

Not just for hot-firing of engines, but for comprehensive system and subsystem-level investigations and optimizations.

Use Cases

Development of a Liquid Rocket Engine

The facility is capable of supporting the development of a liquid rocket engine from component level up to fully integrated engine.

Failure Investigations

A portable test facility can be useful to investigate failure causes, by providing a way to rapidly test subsystems and single components. It can be deployed and ready for testing on very short notice, thus speeding up the investigations.

Acceptance Testing for Production

Components and subsystems coming out of the assembly line can be tested for quality acceptance using a lightweight facility that can be installed near the production site, to save time.